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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,345	02/15/2002	Roger L. Haskin	POU920020010US1	2492

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EXAMINER	
CHANNAVAJJALA, SRIRAMA T	
ART UNIT	PAPER NUMBER
2166	

DATE MAILED: 04/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/077,345	HASKIN ET AL.	
	Examiner	Art Unit	
	Srirama Channavajjala	2164	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-2,7-8,13-14,19-20,24-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,7,8,13,14,19,20 and 24-26* is/are rejected.

7)☒ Claim(s) *3-6,10-12,15-18 and 21-23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to RCE

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/5/2005 has been entered and a non-final Office action as given below:

2. Claims 1-19,23-24,26 have been amended [4/5/2005].

3. Examiner acknowledges applicant's amendment filed on 10/1/2004.

4. Claims 1-26 have been amended [10/1/2004].

5. Claims 1-26 are pending in this application.

6. In view of the applicant submitted "terminal disclaimer", rejection under obviousness-type double patenting as set forth in the previous office action is hereby withdrawn.

Drawings

7. The Drawings filed on 6/3/2002 are acceptable for examination purpose.

Information Disclosure Statement

8. The information disclosure statement filed on 1/26/2004, paper no. # 4 is in compliance with the provisions of 37 CFR 1.97, and has been considered and a copy was enclosed with this Office Action. [see paper no. # 5].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-2,7-8,13-14,19-20,24-26, are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien et al., [hereafter O'Brien], US Patent No. 6038639 in view of Hitz et al [hereafter Hitz], US Patent No. 6721764.

10. As to claims 1,7,13,19, O'Brien teaches a system which including 'providing a file system snapshot' [see Abstract], O'Brien specifically directed to data file storage management system for snapshot operations;

'creating an initial snapshot dataset for a source file having at least one of metadata and data in a file system' [col 5, line 54-63,col 6, line 41-46], O'Brien is directed to data storage or data file storage management, more specifically, creating snapshot data , also teaches creating or assigning track number table entry point associated with track address that corresponds to metadata of the file system; 'wherein the initial snapshot data set contains substantially no data and no metadata' [col 6, line 58-64], O'Brien specifically teaches unused track numbers which is assigned to the virtual track's address that corresponds to dataset contains substantially no data and no metadata;

'copying, in response to accepting the command to modify metadata' [col 6, line 39-40], O'Brien specifically teaches various commands to modify metadata in the data storage system for example copy, delete and like as detailed in col 6, line 39-40;

'storing, in response to accepting disk address values, ditto address' [col 7, line 38-43, line 57-62], O'Brien specifically teaches virtual track address by the processor and list of addresses are stored as detailed in fig 1, further it is noted that virtual track table page instance which has been written on backend data storage device during snapshot copy operation that corresponds to storing ditto address; 'the ditto address indicating that the true disk address for the actual data block stored, subsequent snapshot' [col 7, line 57-62,col 8, line 21-25].

It is however, noted that O'Brien does not specifically teach 'accepting, subsequent to the creating, a command to modify metadata in a second inode within the source file', 'at least a portion of the metadata within the second inode into a first inode within the snapshot', 'data block is stored in one of an inode of the file system'.

On the other hand, Hitz disclosed 'accepting, subsequent to the creating, a command to modify metadata in a second inode within the source file' [fig 4A-4B, col 6, line 5-14], Hitz specifically teaches write anywhere filesystem layout that uses inodes to describe data or files, especially each level inode comprising various data blocks as detailed in col 6, line 5-14,, 'at least a portion of the metadata within the second inode into a first inode within the snapshot' [col 6, line 45-48], 'data block is stored in one of an inode of the file system' [col 6, line 19-26].

It would have been obvious to one of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Hitz et al. into data file storage management system for snapshot copy operations of O'Brien because both O'Brien and Hitz are directed to data file storage management [see O'Brien: Abstract, fig 1; Hitz: fig 1, Abstract, col 2, line 32-34], both O'Brien and Hitz also teach various commands related to data file management that including snapshot operations [see Hitz: col 4, line 17-21; O'Brien: fig 1, element 107], and are from same field of endeavor.

One of the ordinary skill in the art at the time of app applicant's invention to incorporate the teachings of Hitz et al. into data file storage management system for

snapshot copy operations of O'Brien because that would have allowed users of O'Brien to use data structure that including various levels inode bringing the advantages of indirect and direct buffers that manage inodes in WAFL as suggested by Hitz [col 5, line 54-59].

11. As to claim 2,8,14,20, O'Brien disclosed 'appending data to the source file' [col 10, line 14-20],

'copying, in response to the appending, snapshot dataset, at least a portion of metadata' [col 10, line 32-42];

'storing, in response to the appending, disk address values' [col 10, line 46-53];

'ditto address to indicate that the disk address is stored' [col 7, line 57-62,col 8, line 21-25]. On the other hand, Hitz disclosed 'first inode, actual data block is stored in one of an inode of the file system and a subsequent snapshot' [col 9, line 7-10, line 13-24].

12. As to claim 24, O'Brien teaches a system which including 'determining the existence of snapshot that is older than a first snapshot' [col 5, line 39-45], O'Brien specifically teaches snapshot copy operation, and detecting accesses to the original snapshot copy that indicates that snapshot contents and time of creation;

'determining, in response to determining that there is an older snapshot, the

existence of a ditto address in the older snapshot' [col 6, line 58-62], O'Brien specifically teaches creating track numbers, assigning track numbers for read write operations having track address, instances for update the new logical address for the data file;

'wherein ditto address indicates an invalid disk address and that the true disk address for the actual data block is stored in one of an inode of the file system and a subsequent snapshot' col 7, line 57-62,col 8, line 21-25]

'deleting, in response to determining that thee is no older snapshot, or data block in the first snapshot' [col 6, line 39-46], O'Brien specifically teaches copy, delete and other commands related to data file storage management system for snapshot copy operations as detailed in col 6, line 39-46. It is however, noted that O'Brien does not specifically teach 'older snapshot to an inode'. On the other hand, Hitz disclosed 'older snapshot to an inode'[col 9, line 19-24].

It would have been obvious to one of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Hitz et al. into data file storage management system for snapshot copy operations of O'Brien because both O'Brien and Hitz are directed to data file storage management [see O'Brien: Abstract, fig 1; Hitz: fig 1, Abstract, col 2, line 32-34], both O'Brien and Hitz also teach various commands related to data file management that including snapshot operations [see Hitz: col 4, line 17-21; O'Brien: fig 1, element 107], and are from same field of endeavor.

One of the ordinary skill in the art at the time of app applicant's invention to incorporate the teachings of Hitz et al. into data file storage management system for snapshot copy operations of O'Brien because that would have allowed users of O'Brien

to use data structure that including various levels inode bringing the advantages of indirect and direct buffers that manage inodes in WAFL as suggested by Hitz [col 5, line 54-59].

13. As to claim 25, O'Brien teaches a system which including 'wherein if there is a ditto address in the older snapshot, copying to the older snapshot the metadata' [col 10, line 55-17, col 11, line 1-5, line 9-15]; 'datablock in the first snapshot' [col 12, line 47-50]; 'wherein if there is no ditto address in the older snapshot, deleting any inode or data block [col 11, line 1-5, line 9-15]. On the other hand, Hitz disclosed 'data block of an inode in the first snapshot and deleting any inode' [col 11, line 16-22].

14. As to claim 26, O'Brien teaches a system which including 'accepting a request to read data from a first snapshot' [col 5, line 39-45]; O'Brien specifically teaches snapshot copy operation that including reading and writing of data and detecting access to the original data file or the copy as detailed in col 5, line 39-45;

'determining if there is most recent snapshot that is not the first snapshot' [col 5, line 45-52], O'Brien specifically teaches mapping table updates resulting from the snapshot copy operation that that corresponds to indication that most recent snapshot that is not the first snapshot;

'copying, in response to accepting the request and in response to determining that there is a most recent snapshot, that is not the fist snapshot' [col 5, line 45-52, col 6, line 39-46]; 'modified by the restoration of the first snapshot"[col 10, line 26-32], 'copying the data block in the first snapshot to the file system' [col 6, line 58-62],

'determining that there is a ditto address in the first snapshot wherein the ditto address indicates an invalid disk address and also indicates that the true disk address for the actual data block is stored'[col 7, line 38-43, line 57-62], O'Brien specifically teaches virtual track address by the processor and list of addresses are stored as detailed in fig 1, further it is noted that virtual track table page instance which has been written on backend data storage device during snapshot copy operation that corresponds to storing ditto address; 'also indicating that the true disk address for the actual data block stored, subsequent snapshot' [col 7, line 57-62,col 8, line 21-25];

'copying, in response accepting the request and in response to determining that thre is a ditto disk address in the first snapshot, wherein the ditto address indicates an invalid disk address, to the file system' [col 8, line 50-61], 'disk address and that contains a valid disk address' [col 15, line 9-15].

It is however, noted that O'Brien does not specifically teach "the most recent snapshot any inode or data block in the file system referenced by the most recent snapshot', 'wherein if there is an inode or a datablock in the first snapshot, copying the inode'. On the other hand, Hitz disclosed "the most recent snapshot any inode or data block in the file system referenced by the most recent snapshot' [col 5, line 54-62], 'wherein if there is an inode or a datablock in the first snapshot, copying the inode'[fig 13A-B, col 10, line 7-17].

It would have been obvious to one of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Hitz et al. into data file storage management system for snapshot copy operations of O'Brien because both O'Brien and

Hitz are directed to data file storage management [see O'Brien: Abstract, fig 1; Hitz: fig 1, Abstract, col 2, line 32-34], both O'Brien and Hitz also teach various commands related to data file management that including snapshot operations [see Hitz: col 4, line 17-21; O'Brien: fig 1, element 107], and are from same field of endeavor.

One of the ordinary skill in the art at the time of app applicant's invention to incorporate the teachings of Hitz et al. into data file storage management system for snapshot copy operations of O'Brien because that would have allowed users of O'Brien to use data structure that including various levels inode for copying, snapshot at specific disk address or data blocks of current snapshots of the file system, bringing the advantages of creating duplicates only the inode that describes the inode file inodes in WAFL as suggested by Hitz [Abstract, col 4, line 29-33].

Allowable Subject Matter

15. Claims 3,9,15,21, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. The following is an examiner's statement of reasons for indicating allowable subject matter: The present invention relates to generating a file system snapshot, wherein the snapshot is substantially empty. When metadata associated with a source file included in the snapshot is modified, the inode corresponding to the source file is copied to a shadow inode in the snapshot. The closest prior art O'Brien et al. US Patent No. 6038639, Hitz et al. US Patent No. 6721764 show a similar file system snapshot copy operations. However, both O'Brien et al. and Hitz et al. fail to "modifying a source file by one of either overwriting and deleting one of the data blocks corresponding to the source file" in claims 3,9,15; "a first inode in the snapshot dataset, the first inode containing metadata copied from an inode in the source file, wherein the first inode is generated when the data block corresponding to the source file is overwritten or deleted and wherein the first inode includes a disk address of the data block which was written in the snapshot dataset" in Claim 21;

Claims 4-6, 10-12,16-18,22-23 dependent on claims 3,9,15,21 are also allowable.

Response to Arguments

17. Applicant's arguments filed on 4/5/2005 with respect to claims 1-26, especially arguments at page 13-24 have been fully considered, however, upon further consideration, examiner rejected claims 1-2,7-8,13-14,19-20,24-26, are rejected under 35 U.S.C. 103(a) as being unpatentable over O'Brien et al., [hereafter O'Brien], US Patent No. 6038639 in view of Hitz et al [hereafter Hitz], US Patent No. 6721764.

Conclusion

The prior art made of record

a. US Patent No. 6038639

b. US Patent No. 6721764

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Srirama Channavajjala whose telephone number is 571-272-4108. The examiner can normally be reached on Monday-Friday from 8:00 AM to 5:30 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popvici, can be reached on 571-272-.4083. The fax phone numbers for the organization where the application or proceeding is assigned is 703/872-9306

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free)

sc
Patent Examiner.
April 20, 2005.

SRIRAMA CHANNAVAJJALA
PRIMARY EXAMINER